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Wisconsin Public Service Corporation
(a subsidiary of WPS Resources Corporation)
700 North Adams Street
P.O. Box 19001
Green Bay, WI 54307-9001

January 29, 2010

Mr. Nile Ostenso
Wisconsin Department of Natural Resources
101 South Webster Street
Madison, WI 53707

Dear Mr. Ostenso:

Mercury Pollutant Minimization Program Plan Annual Status Report

Enclosed please find the first annual Mercury Pollutant Minimization Program Plan status report for the Wisconsin Public Service Corporation (WPSC) J.P. Pulliam Generating facility for Department. WPSC is submitting this plan as described in the WPDES Permit, Condition 5.2 Schedule of Compliance (WPDES Permit No. WI-0000965-08-1).

Please feel free to call Mr. Mark Metcalf at (920) 433-1833 if you have any questions.

Sincerely,

Howard R. Giesler
Assistant Vice President – Energy Supply Operations

Cc: Mr. Terry Jensky – WPSC
Mr. Kyle Hoops – WPSC
Mr. Randal Oswald – IBS
Mr. Steve Biebel - IBS
Mr. Mark Metcalf - IBS AI

Mercury Pollutant Minimization Program Plan

Annual Status Report

Wisconsin Public Service Corporation
J.P. Pulliam Power Plant
WPDES Permit # WI-0000965-008-1

January 2010

I. Purpose

The purpose of this report is to list the activities instituted as part of the mercury Pollutant Minimization Program (PMP) for the J.P. Pulliam Power Plant. A mercury PMP was developed to comply with the requirements in WPDES permit (Permit No. WI-0000965-08-1), which was issued on July 1, 2006, and modified on May 2, 2008. A mercury PMP was submitted to the Wisconsin Department of Natural Resources on March 30, 2009.

The goal of the PMP is to conduct a facility wide evaluation of the potential sources of mercury that could result in the discharge of mercury from the facility as a result of plant operations. This review did not include mercury that is due to the ambient conditions of the cooling water system source water (Fox River).

II. Source Identification and Inventory

Instruments and Controls

An inventory of mercury containing instrument and control devices at the Pulliam plant was conducted in July 2009. The inventory conducted determined that there is approximately 5.8 pounds of mercury present in switches, relays, thermometers and other instrument and control equipment at the Pulliam plant. Through routine and scheduled maintenance, the remaining sources of mercury present in equipment instrumentation and controls will be replaced with non-mercury controls. All mercury from this equipment will be collected and properly disposed of.

Batteries and Fluorescent Lamps

Fluorescent lamps and batteries are known to contain mercury. To minimize the likelihood of these sources contributing to mercury concentrations in the plant discharge, Wisconsin Public Service Corporation (WPS) utilizes the Lamp Tracker™ and Battery Tracker™ programs by Waste Management, Inc., to collect and recycle used fluorescent bulbs and dry cell batteries. Current recycling practices at the Pulliam plant will be continued for the proper disposal of used fluorescent lamps and dry cell batteries.

Detergents and Cleaners

A material safety data sheet (MSDS) literature search was conducted in May 2009 on detergents and cleaning solutions used at the Pulliam plant. Mercury is a toxin listed under California Proposition 65. Under this rule, companies that operate or sell products within the state of California are required to provide a warning before knowingly exposing anyone to a listed chemical. Regulatory information listed on the MSDS was used to determine if mercury is present (if known) in a specific cleaner or detergent. A literature search of cleaning products did not discover any sources of mercury from detergents or cleaning products.

Process Chemicals

A literature search on the process chemicals used at the facility found that three chemicals are known or suspected to contain mercury: sodium hydroxide (caustic soda) – membrane cell grade, can contain up to 0.5 mg/L mercury and sulfuric acid may contain up to 1.0 mg/L mercury. The MSDS for trisodium phosphate indicates sodium hydroxide is present, therefore; it is possible mercury is present in this chemical. While it is possible that other process chemicals contain mercury, a literature search did not discover other mercury information.

WPS contacted Hydrite Chemical, the vendor who supplies sodium hydroxide and sulfuric acid to the facility, and requested analytical information on the quality of the chemicals they provide. From the additional information provided, it was discovered that WPS is already using the highest grade of sodium hydroxide available. It was also discovered that the manufacturer's who supply sulfuric acid to Hydrite had significantly different quality specifications: some manufacturer's had a maximum allowable mercury concentration of 1.0 part per million (ppm), while others had quality specifications of 0.1 ppm mercury or less.

In addition to a literature search on the process chemicals used at the facility, WPS collected grab samples from five different locations within the plant in August of 2009 to identify which processes are contributing the most mercury to the on-site wastewater treatment facility. The following are the monitoring locations and the analytical result for the samples collected:

Sample Location	Hg Concentration (ng/L)
Boiler Blowdown	0.184 (J)
Demineralizer Acid Rinse	58.0
Demineralizer Sodium Hydroxide Rinse	5.23
Wastewater Treatment Facility Influent	13.4
Wastewater Treatment Facility Effluent	0.515

J – Estimated concentration above the method level of detection and below the reporting limit.
All samples analyzed by EPA Method 1631E.

The results of this sampling indicate that demineralizer rinse waste streams are significant contributors to the amount of mercury directed to the wastewater treatment facility (WWT) and confirm the literature search which indicates sodium hydroxide and sulfuric acid contain mercury. The results of the sampling also indicate that the WWT is effective at removing mercury from the wastewater prior to discharging to the Fox River. However, it should be noted that while the WWT effluent sample result is less than the wildlife criterion listed in NR 105.07 of 1.3 ng/l (the water quality standard established through the Great Lakes Initiative), additional monitoring would be required to demonstrate whether the WWT could consistently meet this standard.

Using the sampling information above and understanding that the use of sodium hydroxide and sulfuric acid at the site are the primary contributors of mercury to the WWT that can be controlled through physical and/or operational changes, WPS contracted Foth Infrastructure & Environment, LLC to evaluate potential mercury reduction technologies or operational changes

that would minimize the concentration of mercury in the plant discharge. The evaluation included the following scenarios:

1. Installation of a Reverse osmosis (RO) process upstream of the boiler water demineralizers reducing regeneration cycles of the demineralizers and the use of sodium hydroxide and sulfuric acid.
2. Treatment of demineralizer regeneration rinse water through the installation a chemical precipitation system to reduce mercury content of the waste water stream.
3. Replacement of sulfuric acid currently used in the demineralization system with a grade containing less mercury.
4. Installation of a RO system combined with the replacement of regeneration chemicals that contain less mercury.

In order to make a direct comparison of the potential for each option to reduce the amount of mercury directed to the WWT, the evaluation assumed that the concentration of mercury in the two chemicals was the maximum concentration provided by the chemical supplier: 0.5 ppm for sodium hydroxide and 1.0 ppm for sulfuric acid. The following is a summary of the estimated capital cost and potential mercury reduction benefit associated with each scenario:

Option #	Description	Estimated Capital Cost ($)	Potential Hg Reduction (lb/yr)
1	Installation of RO system ahead of demineralizers	$750,000	0.739
2	Installation of demineralizer rinse wastewater treatment system	$738,000	0.690
3	Sulfuric Acid – chemical replacement	$0	0.599
4	Installation of RO system and chemical substitution	$750,000	0.799

The evaluation results indicate that replacing the sulfuric acid with a higher grade of the chemical is the best economic option available to reduce the content of mercury in the plant wastewater discharge. While the remaining three options are technically feasible, the installation of an RO system or a system to treat the demineralizer rinse water has a significant capital cost and only provides an incremental increase in the potential reduction of mercury directed to the WWT. None of the above options would completely prevent or remove mercury at the facility. Given that samples collected prior to and after treatment in the WWT show a significant removal efficiency of mercury by the WWT, the investment and installation of an RO system or a separate system for treating the demineralizer rinse water for the purpose of mercury removal is not warranted.

IV. PMP Implementation

As mentioned above, WPS will continue to replace mercury containing equipment through routine and scheduled maintenance. The facility has an established program to reduce the amount of mercury released to the environment through the recycling of fluorescent lamps and

dry cell batteries. WPS is currently working with Hydrite chemical to specify that only the higher grade (lower mercury concentration) sulfuric acid is delivered to the facility in order to minimize the amount of mercury in the discharge from the WWT facility.